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This report presents results of a critical analysis of 20 regional educational laboratories and nine university research and development centers established under ESEA Title IV. Observations, supported by specific examples, are made concerning the laboratories and centers and deal with their roles, programs definitions, impact on educational institutions and processes, staff capabilities, regional and national impacts, unique characteristics, evaluation procedures, and persistent problems. Conclusions show that (1) the national program of educational laboratories is evolving into a functioning system with great potential for improving education, (2) good returns are being realized from the modest investment in laboratories and centers, (3) the best way to realize continued and enlarged gains from educational research and development is to build upon the strength already developed in the laboratory and center system, (4) a more interdisciplinary staffing of centers and laboratories is needed, (5) communication and collaborative effort among the various organizations needs to be strengthened, (6) a higher level of funding needs to be established, and (7) successful research and development in education is both a science and an art which requires qualitative assessment as well as quantitative measurement. (TT)

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FINAL REPORT

Contract No. OEC-3-7-001536-1536

THE NATIONAL PROGRAM
of
EDUCATIONAL LABORATORIES

Report of a study of twenty
educational laboratories
and nine university research
and development centers by
Francis S. Chase

December 17, 1968

U. S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

Office of Education
Bureau of Research

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The research reported herein was performed pursuant to a contract with the Office of Education, U. S. Department of Health, Education, and Welfare. Contractors undertaking such projects under government sponsorship are encouraged to express freely their professional judgment in the conduct of the project. Points of view or opinions stated do not, therefore, necessarily represent official Office of Education position or policy.

The University of Chicago
Chicago, Illinois

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

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INTRODUCTION

In late November 1966, at the request of U. S. Commissioner of Education Harold Howe II, and the then Secretary of Health, Education and Welfare, John W. Gardner, I undertook an overview of the National Program of Educational Laboratories. This undertaking I am now bringing to a close after months of activities which have been both stimulating and rewarding for me.

The study was made possible through arrangements, worked out by the Office of Education with The University of Chicago, which enabled me to spend half time in the investigation of the twenty-nine organizations between the beginning of December, 1966, and the end of August, 1968. A major obstacle was the absence of quantifiable data and of lucid descriptions of the operations of the several centers and laboratories. This handicap was reduced by the openness and helpfulness of the directors and staffs of the several organizations and of the Office of Education personnel. Throughout the investigation all parties concerned maintained an attitude of receptiveness to criticism and to suggestions for improvement, and shared freely their own perceptions of unsolved problems and hindrances to effective functioning.

My orientation started with a reading of the Report of the Presidential Task Force which was the source of many of the ideas later incorporated in the Elementary and Secondary Education Act of 1965, which paved the way for establishment of the regional educational laboratories. Other documents which were helpful were the Office of Education Guidelines, reports from the several centers and laboratories, and the report of a special study conducted by a distinguished group of educators under the chairmanship of Professor Lawrence A. Cremin.

The study initially focused on the twenty regional educational laboratories which were established in 1966 under Title IV of the Elementary and Secondary Education Act of 1965. Later it was extended to the nine university research and development centers, two of which were established as early as 1964 and one of which began operation as late as September, 1966. All of the centers and laboratories were visited one or more times between December, 1966 and July, 1968; and impressions gathered were communicated periodically to the Secretary of Health, Education and Welfare, the Commissioner of Education, and to others in the Office of Education, the Federal Bureau of the Budget, and the National Advisory Committee on Educational Laboratories.

From the beginning I cast myself in a role which would enable me to take an objective view of operations and achievements and to communicate my observations in a spirit of friendly collaboration. As a sympathetic but detached observer I endeavored to analyze the strategies and operational processes of the several centers and laboratories and to assess the actual and latent contributions of these operations to the development and diffusion of improved educational programs and systems. At every opportunity I communicated my tentative impressions and stimulated conversations to test my impressions against the experience and judgment of other observers and of those actively engaged in shaping and administering the new organizations. Throughout the study, I tried to deal speculatively and analytically with problems encountered in establishing the viability of laboratory programs and to weigh the probable effects of alternative policies and procedures.

At my request Kjell Eide, Director of Research and Planning for the Norwegian Ministry of Education, spent two months studying the planning processes employed by the twenty regional educational laboratories. His report, which is summarized in Appendix C, and his supplementary oral observations provided invaluable insights into the strengths and weaknesses of the planning processes used by the laboratories. Highly useful too were the observations of the following persons, each of whom participated in visits to one or more laboratories: Stephen Bailey, member of the Advisory Committee and Dean of the Maxwell Graduate School at Syracuse University; Oscar Chute, formerly Superintendent of Schools in Evanston, Illinois; Daniel Griffiths, Professor of Education and

Dean, School of Education, New York University; Francis A. J. Ianni, Professor of Education, Teachers College, Columbia and formerly Associate Commissioner of Research, U. S. Office of Education; and H. Thomas James, Dean of the School of Education, Stanford University.

My views on the centers and laboratories were shaped, and my insights sharpened, by discussions with the special panel of consultants brought together on January 2, 1967, with the National Advisory Committee, and with Office of Education personnel.

There were a clear understanding with Secretary Gardner and Commissioner Howe that this was to be largely a one-man impressionistic study, the chief purpose of which was to provide some guidance for federal policy respecting the laboratories and centers, a purpose to be served primarily through conferences and informal reports to the responsible officials and to the staff of the Division of Educational Laboratories rather than through a formal report. A secondary purpose, which emerged as the study progressed, was to encourage those responsible for the governance, management, and operation of the several centers and laboratories to clarify their objectives, re-examine the assumptions underlying their choice of activities, and to delineate more precisely the intended effects and the means necessary to achieve these effects. The success of the undertaking must be appraised, therefore, in terms of any influence exerted on clarification of the concept of educational research and development, and the conditions essential to effective performance; and any contributions to the evolution of the laboratories and centers into more effective organizations for the adaptation and transmission of knowledge and technology into the stream of educational practice.

My schedule of visits and other activities is shown in Appendix A; and one example of the way in which impressions were shared is the address to the New Orleans meeting in Appendix B. It is my conviction, however, that the most important communications were those made orally to officers and staff responsible for administration of the National Program of Educational Laboratories, the National Advisory Committee, and personnel associated with the several centers and laboratories. The present report is little more than an epilogue containing some observations which supplement those made earlier.

GENERAL OBSERVATIONS

The nine university research and development centers and the twenty regional educational laboratories constitute an important part of the national effort to bring the full power of science and technology into the service of education; even though the conditions attending the establishment and early operation of these twenty-nine organizations have not been uniformly conducive to effective operation. The concepts which led to their founding were powerful, but vague; and incorporated differentiated, and not always mutually consistent, perceptions of roles and functions. As a result, the centers and laboratories often had difficulty in defining their primary functions and identifying the particular expectations to which they can respond appropriately. As they began to find themselves and sort out the problems requiring attention, they became painfully aware that it was necessary to undertake tasks for which the knowledge base is weak and performance skills and technologies poorly developed. While working their way through these problems, the early promise of ample funding became clouded, resulting in a new set of uncertainties.

While the foregoing factors have produced considerable frustration, they have not prevented the evolution of a majority of the centers and laboratories into institutions with a promise of power for the improvement of education. Indeed as I reflect on what I have learned through visits of one to several days to each of the laboratires and centers and continuing dialogues with their staffs and with administrative personnel in the Office of Education, I am confident that these new institutions within the next ten years and beyond will make notable contributions to the advancement of education as an art, as a science, and as an instrumentality for realization of human potential and aspirations. Partly through foresight and design, partly through the ingenuity of persons associated with the planning and operation of the centers and laboratories, partly through the persistent probing and evaluation of Office of Education staff and advisors, and partly, perhaps, through happy accident, the new institutions are beginning to shape up as major contributors to educational research and development.

The following paragraphs discuss the missions, objectives, and operational procedures of these new agencies in terms of evolving concepts of the nature of educational research and development. Attention is given also to conditions which are believed essential to improved operation and effectiveness. The major conclusions reached as a result of the study are summarized in the final section.

Continuous Adaptation

The centers and laboratories are demonstrating the possibility of systematic adaptation of knowledge and technology to educational use through a set of closely related processes ranging from the design of models and prototypes through the successive modification of materials, technologies, strategies, and systems for the achievement of specified effects.

Our older educational institutions were not well adapted to provide continuous development based on research. Because of this, we have had a history of erratic innovation in education. All too often, heralded innovations have meant the introduction of partially worked out ideas and systems without adequate provisions either for continuing refinement or for the modification of other elements with which the new components must interact. The result frequently has been failure to achieve the expected benefits and consequent discard of theories and technologies before full exploration of their usefulness. In other words, we are suffering in education not so much from lack of innovation as from arrested development. The educational landscape is littered with bright ideas which once evoked high hope and with technologies and systems imperfectly adapted to educational use.

Among traditional educational organizations, there is not one which has as a primary function the development and continuous refinement of programs and systems which can be counted on for reliable performance under stated conditions. Teachers and other school personnel are too fully occupied with the demands of the moment to engage in extended and systematic development, even if the necessary facilities were placed at their disposal. Philosophers and other theoreticians typically are content with speculative solutions of educational problems, and few go so far as John Dewey in creating laboratories for the testing of ideas. University scholars contribute importantly to empirical and other types of research; but their concepts of their own roles and the value systems of universities do not predispose them to go very far in incorporating research findings into instructional materials or working systems ready for educational use. State departments of education through consulting services, accreditation processes, and otherwise, play an indispensable part in the diffusion of tested technologies and systems; but they are not well adapted to the conduct of extensive problem-oriented research or the translation of such research into developmental products.

A majority of the laboratories and centers now seem to be functioning in ways which promise not merely to speed up the application of relevant knowledge and technology to education, but also to provide mechanisms and processes for continuous modification and refinement of programs, procedures, and institutional settings. Moreover, the laboratories and centers are beginning to function as complementary institutions which (1) draw their capital of ideas and technology from universities and other sources, (2) enlarge the capital of knowledge and technology through systematic development processes, and (3) link up with state departments of education, Title III centers, and other agencies to bring about widespread installation and effective use in educational practice.

A few examples will illustrate the evolution of the laboratories and centers. The system known as IPI, or Individually Prescribed Instruction, was conceived by Professor Robert Glaser as a result of his experimental analysis of learning behaviors at the University of Pittsburgh. The establishment of the Research and Development Center at the University of Pittsburgh made it possible for Glaser to maintain a staff with the requisite scholarly and technical qualifications to develop, test, and refine the model and to define the conditions necessary for its effective use. Later with the founding of the regional educational laboratories, the Center's efforts were extended through close collaboration with Research for Better Schools, a laboratory with headquarters at Philadelphia. Because of its inherent power, IPI doubtless would have been adopted in a number of schools and would have brought about at least some temporary increase in the amount of individualization, even without the intervention of research and development centers or laboratories; but it is not likely that its inherent capabilities would have been developed so quickly or so fully or with equal promise of continuing refinement with extended use. Research for Better Schools not only is contributing to the diffusion of IPI, but also is identifying problems in installation and use in a variety of situations and with learners of different cultural backgrounds and aptitudes. As a result of this experience, modifications in data collection and analysis and in the evaluation of effects can be instituted. The laboratory, through close interaction with the Research and Development Center at the University of Pittsburgh, is contributing to theoretical knowledge as well as to procedural refinements.

Recently, with the encouragement of the Office of Education, a considerable number of other laboratories have agreed to introduce IPI in their regions and to experiment with ways of increasing the usefulness of the innovation. Two-way channels of communication are being established between the laboratories and the Pittsburgh Center and a communication network will link the laboratories so that what is learned by one will be shared by all. It is my anticipation that in time this will lead to the writing of individualized programs which take into account not only the existing knowledge and performance skills of individuals, but also personality differences and cultural variables. IPI, therefore, instead of being pushed as a perfect solution or as a finished product will continue to benefit from experimental attempts to improve its operation and to identify the conditions necessary for optimum results.

Another example of the operations of the centers and laboratories is the use of the tactic called micro-teaching with video-recorders as a means of increasing the performance skills of teachers. This invention worked out at Stanford University, originally with the help of grants from the Ford and Kettering Foundations, became one of the instrumentalities selected by the Stanford Research and Development Center in its efforts to discover the effects of teaching on learning and the possibilities for modifying teacher behavior to increase learning. Because of the Center's mode of operations and the staff it has been able to maintain, this development has received wider application and has been subjected to greater refinement than would have been possible otherwise. In recent months the Far West Laboratory for Educational Research and Development at Berkeley has capitalized on the Stanford experience to develop mini-courses, or self-instructional packages, which it is trying out under a variety of situations for the in-service education of teachers. The laboratory has not taken the Stanford model as a finished product, but as one which is susceptible of continuing improvement. Other laboratories also have initiated experiments with videotaping and micro-teaching and are introducing refinements of their own. A communication network is developing which links the several laboratories experimenting in this area with each other and with the Stanford Center.

Another event in teacher education indicates the growing influence of the laboratories on the development and diffusion of new concepts and technologies. The Northwest Regional Educational Laboratory at Portland became the spearhead for a five-state proposal which commits a broad array of agencies and institutions within the five-state area to developing a model of competency-based, field-centered teacher education. The proposed instructional model consists of four elements: (1) objectives in the form of competencies to be mastered, (2) instructional systems designed to develop the competencies, (3) measurement systems to assess the level of mastery, and (4) a computer-based information management system. This proposal could not have been put together but for the staff capabilities, the ways of working, and the developmental contributions of the laboratories and centers. It draws heavily on work done by at least two of the university research and development centers and several of the laboratories. Agencies committed to participating in the development include more than twenty-five colleges and universities, five state departments of education, the teaching research division of the Oregon State System of Higher Education, Litton Industries, and the Department of Instructional Systems Technology at Chapman College.

Another strategy employed by the laboratories is represented by the systems approach to curriculum building which is used by the Central Midwestern Regional Educational Laboratory at

St. Louis in its mathematics program; by the Southwest Regional Laboratory at Los Angeles in curriculum developments in reading and problem solving; by the Southwest Educational Development Laboratory at Austin in its bilingual and other programs; and by several other laboratories.

In this approach the curriculum is treated as a system for generating and reinforcing behaviors which eventuate in added skills, new perceptions, and increased capacity to direct future experience--in other words as a system or mechanism for regulating learning environments to facilitate attainment of specified and agreed upon educational objectives. The laboratories direct their efforts not only to producing new instructional materials, but also to modifying other components of the educational systems such as teacher behaviors, time allocations, social interactions, the sequencing and organization of activities, and provisions for evaluation and reinforcement.

The development goes through a whole series of stages in which there is continuing attention to the assessment of the situation or system; to identification of goals or purposes; and to the choice of intervention strategies or approaches. The construction of rough skeletal models or prototypes guides the design, construction, and assembly of components; and the new or revised systems are given initial tests in laboratory situations, and extended tryouts in field operations. The pilot tests lead to refinement and redesign as needed, followed by pilot-installations of the revised system and evaluation under a variety of conditions. Feedback from installations leads to further refinement of the system; and provides the basis for promulgation of the potential benefits, the conditions essential to effective performance, and the costs of installation and maintenance. Diffusion is sought through collaboration with other agencies to promote adoption, effective use, and continuing evaluation. Provision is made for continuous monitoring to ascertain the full range of effects, to discover inadequacies in design, or other causes of low performance, and to incorporate corrections and refinements based on feedback and research.

The laboratories and research and development centers are also engaged in construction, testing, and refinement of simulation games. The Johns Hopkins Research and Development Center is developing a wide variety of games for use in social education and decision-making; and is experimenting with games experience as a basic learning variable. The Central Midwestern Regional Educational Laboratory is using games as part of a multi-media approach to the complete individualization of mathematics instruction. Other laboratories are beginning to explore the possibilities of games for a number of educational objectives.

Among the strategies being used by the laboratories in addition to those implied in the foregoing discussion are diagnoses of individual and cultural group needs with the assistance of linguists and anthropologists, the use of sophisticated technology such as data processing and computer assisted instruction, and new planning procedures which involve the use of systems analysis, cost-benefit analysis, and new approaches to the involvement of the family and community agencies in the process of education. These approaches are reflected in a proposal for multi-cultural social education recently developed by the Southwest Educational Development Laboratory in collaboration with the Region XIII Education Service Center. Similar influences may be observed in program development in several other laboratories.

Improved Program Definition

Within the past two years most of the centers and laboratories have achieved a sharper focus, better program delineation, and closer integration of activities.

Identification of a major problem or set of problems amenable to solution through research and related development appears crucial to the success of attempts to create improved educational systems. It is important that the problems selected be of such importance that progress in solving them will produce significant consequences for education; and it is equally important that the problems be defined so that appropriate methodologies may be applied to them. A few centers and laboratories initially chose missions involving sets of related problems which provided suitable foci for activities; but others stated their goals in terms so broad that it was difficult to lay out any consistent set of strategies or tactics for coming to grips with the problems involved.

Another requirement for successful research and development work seems to be the existence of knowledge and technologies which are at least potentially applicable to the types of operations visualized. Insufficient attention has been given to this requirement with the result that some laboratories and centers have committed themselves to missions or sets of objectives for which there is little validated knowledge and little or no tested technology. This might be acceptable for basic research organizations staffed with imaginative scholars who have well-based ideas as to how such problems may be formulated in research terms and the kinds of methodologies of inquiry which might be appropriate. The centers and laboratories, however, were not conceived as organizations devoted primarily to basic research; and few, if any, have adequate concentrations of scientific or other scholarly talent to lay out research designs for fields as loosely specified as higher education or raising the quality of education in a region.

The definition of a mission or areas of activity becomes meaningful only in terms of specification of (1) the intended outcomes or effects, (2) the inputs or resources required, (3) the stages of research and of development and the time required for each stage, and (4) the provisions for checking on the relevance of the processes, the adequacy of the resources, and the quality of products or effects achieved.

In the rush to get started and to involve many persons and agencies in their regions, several of the laboratories were anything but precise regarding the intended effects and the means of achieving them. Even worse, they often were unclear as to their primary functions: Some conceived their tasks in terms of dissemination more or less after the model of the Agricultural Extension Service but without any clear idea of what was to be disseminated; others seem to have conceived themselves as agencies for improving the quality of education in their regions through services to schools and other agencies and through widespread involvement of school people and citizens; and one or two saw themselves as agencies for the funding of educational research in regional universities or other institutions. All of these activities appeared legitimate in terms of the early guidelines of the Office of Education and in terms of the proposals which had become the basis for contracts and grants; but many of them became untenable in the light of subsequent experience.

Fortunately, through their own experience and with the help of Office of Education staff, review teams, and other consultants, the laboratories have moved with considerable vigor to tighten the definitions of their missions and to specify the measures and stages through which they hope to attain the postulated outcomes. The evolution of program definition is indicated clearly in recent reports from several of the laboratories. For example, the Central Midwestern Regional Educational Laboratory initially developed forty exploratory projects; but in 1967 it began to reduce the number of projects and to concentrate those selected in five programs focused on curriculum and instruction. The shift from projects to integrated programs has reduced the number of activities and increased allocations to the remaining programs.

Similarly, the Center for Urban Education has moved "from eclectic organization to a centrally programmed institution" with: an urban elementary curriculum program composed of four major components and a community development program focused on decentralization and desegregation. These programs reinforce each other and bear upon the common concern of developing more effective relations between the culture of the school and the culture of the local community. Program support services are provided by four committees: educational research, educational personnel, social research and communications.

The Southwest Education Development Laboratory has consolidated its major programs into deeper channels, phasing out certain components and adding others to achieve new force in working toward its goals. Moreover, the steps of the development process for each anticipated product have been defined more sharply, thus making possible better analyses of the resources to be allocated to each of the process stages.

The Southwest Regional Laboratory at Los Angeles reports that "While the product development objectives have not changed, we are sharpening a good deal in both our product development operations and our forward plan for installation of products currently being developed." This laboratory uses a well worked out "Product Development Cycle" and is moving toward a distinction between _cycles_ of improvement and _generations_ of improvement.

Several of the centers started with relatively clear-cut concepts of their missions and the means of accomplishing them. For example, the Learning, Research and Development Center at the University of Pittsburgh drew on previous experimental analyses of learning behaviors by Director Robert Glaser and others, and was designed to promote further research on the learning process and the application of the knowledge gained to the development of procedures, materials, and equipment of instruction, with subsequent trial of products and programs in school settings which would permit continuing experimentation and evaluation. Similarly the Wisconsin center focused on cognitive learning and creation of instructional systems and environments to facilitate cognitive development; while Stanford addressed itself to the improvement of teaching through skill development and modification of other teacher behaviors. In fact, the centers with two exceptions started with at least some kind of unifying concept--a higher average than found among the laboratories, attributable possibly to the superior research sophistication of center staffs as contrasted with the staffs of most laboratories.

The original proposal for the Center for the Advanced Study of Educational Administration at the University of Oregon identified eight areas for investigation so broadly stated as to lead to a wide array of studies which appealed to one or more staff members as relevant to the understanding and improvement of educational administration. This Center provides an interesting example of an educational research and development organization which has used improved processes of planning to move from a loosely conceived and structured operation toward an integrated program with consciously selected strategies of research and development. By profiting from analysis of its own experience and by weighing the criticisms of site visiting panels and Office of Education personnel, the Center has moved rapidly within the past two years to focus its activities on the development of organizational and administrative arrangements that can accommodate rapidly changing instructional concepts and processes and adapt to emerging needs and problems. To put the matter another way, the Center has veered away from the support of project research in the direction of team planning for problem-oriented research and development. The Berkeley Center for Higher Education is undergoing a comparable evolution.

Integrating Research and Development

The centers and laboratories are beginning to conceive research and development as a closely integrated system for producing specified changes in educational institutions and processes.

Educational research and development may be viewed as a unitary concept and not simply as a combination of some research with some development. It may be thought of primarily as a set of interrelated processes for dealing with problems in the context of the systems or situations in which they arise. It leads to the modification of existing systems for more effective performance and/or construction of new subsystems for performance of specified functions. The search is not so much for a perfect solution or product, but for the best that can be devised through the use of existing knowledge and technologies. Simultaneous processes of research and invention are employed to increase the working capital of applicable knowledge and technology. The research is development-relevant or motivated whether used to improve understanding of phenomena, to contribute to the solution of identified problems, or to test the effects of operations. The development in turn is research-informed, or guided, though not research-limited. Research is essential to systematic and continuing extension of the knowledge base on which development rests; and development constantly poses new problems which require research. At its best development often outmarches research by imaginative theoretical constructions and inventions; but as it does so, it gives new impetus to research and counts on the latter to regulate the pace for the health of the systems, societies, and individuals concerned.

If we can judge by experience in such enterprises as agriculture, atomic energy, medicine, and space exploration, a powerful system of research and development for education will require many subsystems functioning through many institutions and agencies--including government, industrial corporations, "quasi non-governmental organizations," and universities. Our experience in education is not yet sufficient to allow us to predict with any assurance the limits of the contributions to be expected from each kind of agency, the ways in which the several agencies may complement each other, or the conditions required for effective performance by each type of agency. It is reasonable, however, to expect the university research and development centers to play a major part in such activities as (1) codifying the knowledge relevant to particular sets of problems or needs in education and drawing theoretical inferences for the construction of models and prototypic programs; (2) identifying serious gaps in existing knowledge and mobilizing the resources represented by the several disciplines within the university to fill these gaps; (3) designing experimental procedures, materials, and systems to achieve specified objectives or changes in educational institutions and practices; and (4) testing the experimental programs or systems sufficiently to indicate their potential and the conditions required for realizing the potential.

The nine university centers which are in operation appear in general to be directing their efforts in the four indicated directions, but their success is conditioned by several factors. Among these is the definition of specific goals or targets to which concentrated, systematic efforts can be directed. This was discussed in the preceding section. All centers appear now to be moving toward definitions of purposes which will permit concentration of efforts on crucial problems and team-work in the formulation of theoretical models or systems; but some are still far from achieving a tightly defined and closely coordinated set of activities.

Another conditioning factor is the ability to mobilize relevant scholarly resources within the university. The evidence on this point is mixed. Some centers do not appear as yet to have drawn heavily on disciplines not closely allied with education. The extent to which interdisciplinary resources are utilized may be related to the place the center occupies in the university structure, but observation indicates that a more crucial factor may be the qualifications of key staff members and the extent of their commitments to the work of the center, both in terms of time and the value attached to activities.

To move systematically toward meeting educational needs through the production of knowledge and its application to educational systems will require continuing attention to a wide range of interrelated tasks and processes. If educational systems are to respond to individual and institutional needs, the first requirement is a systematic and persistent assessment of needs for education in the society and the degree to which they are being met by existing institutions and practices.

In the past we have relied largely on demand for education as expressed by organized and politically articulate groups or as manifested in the manpower requirements of government and industry. The result has been the neglect of many needs until they reach crisis proportions and a failure to develop sensitive indicators of the effects on many individuals and powerless groups of inappropriate or inadequate educational treatments. Measurement of pupil achievement and evaluation of the performance of educational institutions provide only surface indications of deep underlying needs of individuals which require continuing observation with instruments sensitive to human aspirations and emotions.

Assessment of the needs for education is essential to the selection of goals and problems for educational research and development; but it is likewise essential to the functioning of all educational institutions. Its proper performance probably requires a network of agencies designed for the purpose of identifying and communicating needs and possible ways in which they may be met.

Research and development agencies by their nature intervene in systems which they do not control. This suggests the importance of continuing assessment of the situation or system which is the object of intervention in order (a) to identify functions to which operations are addressed (both nominally and actually); (b) to determine adequacy of performance relative to needs and resources; (c) to reveal operational problems, including those incident to intervention; and (d) to measure changes in the system produced by the new inputs. As deficiencies and problems appear, the need is underscored for a continuing search for knowledge relevant to the problems to be solved and persisting attempts to draw inferences which may be treated as testable hypotheses and/or incorporated into the design of experimental models or systems.

The centers and laboratories are finding it necessary to reconsider periodically their choice of intervention strategies and the application of the strategies to decisions on (a) scope and sequence of activities, (b) persons and agencies to be involved in various phases and stages, and (c) tactics to be employed in initiating and reinforcing constructive change. Centers typically address themselves to identification and/or formulation of theoretical models or systems to perform stated functions; and sometimes to the design of components or elements required to move from conceptual to working models and assembly of components into consistent systems. Centers and laboratories share in testing working models or systems in laboratory situations to reveal malfunctioning, unsolved problems, and undesired side-effects; and in subsequent refinement and redesign as needed to correct defects and increase power and efficiency. The laboratories typically arrange further testing under a variety of field situations to gauge performance more precisely, to reveal modifications required by characteristics of the population served and other variations in situations. Collaborating centers and laboratories share responsibility for progressive precision in specification of intended effects and of the resources and processes necessary to produce the desired effects. Careful analysis of the yields or benefits of the new or revised system under specified conditions, and of the measures and costs involved in maintaining the specified conditions is likewise a joint responsibility.

It appears that university-based centers possess high potential for performance of functions which require ready access to sources of knowledge (both published and unpublished) and to the analytical power and research technologies represented by the several disciplinary communities. Access to interdisciplinary knowledge and research methodologies does not flow to the centers, however, simply because of the university setting; and the degree to which the potential power is brought to bear on high-priority problems depends largely on the ability of each center's staff to tap the resources. All centers need to enlist the aid of university administrators, faculty colleagues, and qualified consultants in changing procedures and policies for recruitment, appointment, and recognition as necessary to attract persons with the requisite abilities.

The laboratories are making significant contributions to many of the processes discussed. They seem better adapted than most university centers to widespread diffusion of tested innovations and systems through collaborative relationships with schools, colleges, and other agencies; and they are devising strategies to promote installation, effective use, and continuing evaluation. Continuous monitoring to ascertain the full range of effects and discover inadequacies in design and other causes of unsatisfactory performance is another function in which laboratories are linking up with centers. They employ evaluation and feedback from users and observers to modify, complement, and/or replace systems as new needs appear or as higher levels of performance are required.

At every stage appropriate research technologies are needed to (a) fill gaps in knowledge, (b) reveal relationships among system components and other variables, and (c) evaluate the achievement of objectives and associated effects. Both centers and laboratories have an obligation to develop communication systems and dissemination strategies which will expose to the general public, and to audiences with specialized competencies for various types of operations, the basis for each of the crucial decisions and the consequences of the decisions.

Increased Staff Capability

A majority of the laboratories and centers have increased staff capability appreciably within the past two years; but few can yet be said to have capabilities adequate to the tasks involved in accomplishment of their missions.

Effective performance of research and development functions in education as in other fields is contingent upon bringing together a "critical mass" of resources to generate knowledge and to convert available knowledge and technology into powerful instruments for improved performance in the achievement of specified outcomes. Although the stronger centers and laboratories have made strenuous efforts to increase staff capability, it cannot yet be said that any of these organizations is adequately staffed to achieve the objectives to which it is addressing itself. One of the urgent needs, therefore, is to increase staff capabilities by employing persons with abilities not adequately represented in the existing staffs and by systematic programs to increase the capabilities of those employed.

Among the skills particularly critical to high performance are those required in planning, program design, information processing, and evaluation. Of equal importance are the qualities of scholarly competence required to identify relevant knowledge and to supplement it as demanded by the tasks at hand; and for significant contributions to curriculum, instruction, or the management of learning environments, creative imagination is indispensable. A further need is for persons of unusual insight and skill in the identification and resolution of the value conflicts which inhere in important educational decisions. A systematic nationwide effort is required to identify persons with the necessary potential and to train them for responsibilities in program design, systems analysis, evaluation and other specialized abilities required for successful operation of educational research and development agencies.

Most observers seem to agree that the present staffs of most of the laboratories and centers are inadequate in numbers of full time (or equivalent) professional personnel and in many of the specialized abilities relevant to their proclaimed missions and objectives. For example, a number of the laboratories are attempting to develop programs of reading and language arts for special cultural groups with insufficient guidance from those with requisite competence in such fields as anthropology, linguistics, and child psychology; others are venturing into curriculum building without having on their staffs or among their regular consultants, recognized scholars in the relevant disciplines. In some cases research and development centers appear not to have among their key staff members individuals who can tap the scholarly resources applicable to the problems under study or enlist the help of scientists and other scholars within the universities who might provide invaluable assistance. In other centers and laboratories the size of the professional staff appears too small to permit sufficient monitoring of experimental programs to assure maintenance of the postulated conditions.

The obstacles to the development of the requisite staff competence are formidable. Uncertain and insufficient funding make employment of qualified persons extremely difficult, especially when there is a critical scarcity of persons qualified to make significant contributions to educational research and development. Other obstacles include the inability of a few of the directors to understand the kinds of knowledge required, and the sources where knowledgeable persons may be sought, for the particular types of research and development in which they hope to engage. This factor is also compounded by poor program definition. Fortunately, many of the centers and laboratories started with a nucleus of highly qualified personnel.

There also is evidence of improvement in staff capabilities within the past year. For example, the Central Midwestern Laboratory has appointed new specialists in statistics, systems analysis, sociology, mathematics, and other fields. The Eastern Regional Institute for Education has named a Director of Professional Resources who has been instrumental in adding a learning psychologist, a systems analyst, and a measurement and evaluation specialist. The Far West Laboratory on Educational Research and Development has used a "profile of abilities" to insure a good mix of skills and knowledge; and has added specialized abilities in statistics, publications, communications, Indian Education, and political science.

The Northwest Regional Educational Laboratory has added several specialists and is still seeking a computer specialist, media specialists, a communication technician, and additional research specialists. The Southwest Educational Development Laboratory has added to its staff in research and evaluation, and employed additional specialists in bilingual and Mexican education. This laboratory is seeking a systems analyst, and persons with strong specialization in each of its curriculum areas. Among the recent appointments to the Upper Midwest Regional Educational Laboratory are a new director, a deputy director for program planning and development, and a psychologist with research experience in animal and human behavior and human motivation.

Staff development has been furthered through training of those employed as well as through employment of additional persons. The Central Midwestern Laboratory sent three of its members to a four-week workshop set up in collaboration with the Southwest Regional Laboratory and Research for Better Schools; and provided staff training at nearby universities in preschool education and required technical skills. The Northwest Laboratory has provided formal training in three-day sensitivity workshops for all professional staff members and has used consultants on a regular basis to work with staff members on problem-solving and evaluation; moreover, development through concentrated sessions of problem-solving in staff retreats has been a continuing practice. The Southwest Laboratory at Austin involved all of its staff members in a conference focused on the implications of the conceptual framework of the social sciences for the laboratory work in intercultural education. Staff seminars likewise have been held to improve management techniques, to develop stronger capabilities in evaluation design and applications, and to provide familiarity with program planning and budgeting systems.

Staff capability obviously is a major factor in the performance of the university centers for educational research and development. Scholarly competence of a high order and of considerable diversity is required in order to draw upon the knowledge and knowledge producing resources to be found in universities. It is also important that center staffs include researchers who are strongly motivated to translate knowledge into instructional systems or other educational products. Some of the centers appear to have had problems in commanding adequate time of faculty members on their staffs. Others, for one reason or another have failed to enlist the energies of scholars in disciplines which have an important bearing on the solution of the particular problems with which they are dealing. In several cases, the level of funding appears inadequate to bring together a staff commensurate with the missions to which the centers are committed.

A National Network

We are developing a distributed national network of laboratories which operate from a local or regional base but serve national purposes and produce national impact.

Considerable controversy has centered on the question as to whether the laboratories should be viewed essentially as institutions serving particular regions of the country or as parts of a national network of laboratories.

Some view the laboratories as basically regional institutions composed of members (consisting usually of institutions and organizations rather than individuals) drawn from defined geographic regions and governed by regional boards of directors which mobilize and develop regional resources and address themselves to the unique or distinctive needs of the areas served. In support of this position, it is argued that innovation and improvement of education are most likely to occur through the close involvement of persons who have responsibility for implementing the changes. It is also contended that regional operation will remove any possible threat of national domination and increase the confidence of citizens generally in the research and other products of the laboratories. It is said further that the several regions of the country differ significantly in the effectiveness of their provisions for education and in the educational needs of their populations, as well as in the strength of the universities, state departments of education, and other educational agencies. Regional operation, therefore, is believed to contribute both to flexibility and effectiveness in the operation of the laboratories.

Others hold that the laboratories are designed as part of a national program for accelerating the reform of educational practice and the reconstruction of educational institutions. Their contributions are seen as falling largely in the area of applied science, but with due attention to basic research as required and to dissemination of improved products and processes--largely through interaction with existing state and local school systems and other educational agencies. Under this concept each of a limited number of laboratories would be expected to mount a carefully planned, large-scale effort to develop more effective ways of improving curriculum and instruction or apply new knowledge and technology to the structure and functioning of educational institutions. One of more laboratories, for example, might concentrate on a particular category of problems such as how to strengthen motivation for learning and how to remedy the damage caused by environments deficient in sensory, linguistic, or other types of experiences essential to success in education. Other laboratories might elect to exploit fully the possibilities inherent in particular kinds of technologies or to test promising theoretical formulations; and some might choose a multi-faceted approach to the achievement of specified objectives with designated populations.

Experience seems to indicate that the more successful laboratories achieve national visibility and influence because of the power of the concepts with which they are working and their ability to incorporate these concepts in operational systems of superior performance. This is true of the Northwest Regional Educational Laboratory which has a strong regional orientation to its five-state area; the Center for Urban Education which addresses itself to problems of urban education through activities concentrated largely in the New York metropolitan area; and the Southwest Educational Development Laboratory which is devoting major attention to meeting the special needs of non-English speaking populations and other groups in Texas and Louisiana for whom educational opportunities are grossly inadequate. It is likewise true of laboratories where regional identification is somewhat weaker as in the cases of Research for Better Schools which is involved in nation-wide tryouts of Individually Prescribed Instruction; or the Far West Laboratory for Educational Research and Development which is developing nationally applicable instructional models for changing teacher behaviors.

Regional boundaries in most cases are loosely drawn and several of the so-called regions are no more than arbitrary groupings of two or more states with adjoining borders such as Colorado and Utah, Illinois and Indiana, or Michigan and Ohio. Obviously there are advantages in conducting laboratory and preliminary school tryouts of innovations in locations accessible to laboratory staffs without consumption of large amounts of time in travel. There doubtless are some kinds of problems which appear in certain locations in concentrated form or under circumstances facilitating study. There are also advantages in the distribution of laboratories so that educators and educational organizations in all parts of the country have opportunity to become involved in innovative experiments.

My conclusion is that it is desirable to have one or more laboratories in the Northeast, the Northwest, the Southeast, the Southwest, the North Central, the South Central, and other major regions; but this does not mean that there is any special validity in the present so-called regional grouping of laboratories.

Distinctive Orientations

All of the laboratories now conceive their functions in terms of development of tested products, operable systems, or other demonstrably useful contributions to the improvement of educational institutions and processes; but each laboratory has unique characteristics; and some distinct types of orientation have evolved.

While no two of the laboratories are identical with respect to mission, function served, or mode of operation, it is possible to distinguish several kinds of dominant orientation, such as (1) product development, (2) regional development and, (3) orientation to a closely defined set of problems. The Far West Laboratory, Research for Better Schools, and the Southwest Regional Laboratory all concentrate heavily on the development of products such as self-instructional programs for teachers, individually prescribed instruction, or an integrated primary curriculum. These laboratories also make contributions to development of the resources in the region and provide some consultative and other services; but their chief claim to distinction is the improved instructional or other systems which they develop to the point of readiness for installation in a variety of school situations, and which they continue to refine in response to evaluation and feedback from users.

The Appalachia, Northwest, and Southwest Development laboratories likewise produce instructional materials and systems; but their dominant emphasis appears to be on a set of strategies calculated to raise the quality of educational practice and to enhance the educational resources within the region served.

The Center for Urban Education, The Education Development Center and the Mid-Continent Regional Laboratory are oriented to the solution of certain kinds of problems such as early childhood education and socialization in the inner city, community involvement in improvement of the quality of schools, or the development of self directed learning systems. Some of the other laboratories do not manifest so clearly a dominant orientation. The Central Atlantic Laboratory at the moment seems to qualify under the product-development orientation; since it is focused on the development of a curriculum in arts, music, drama, dance, and literature for children three to eight. The Eastern Regional Institute for Education might also be said to be product-development oriented because of its intention to design a system for installing and monitoring a new curriculum in schools of diverse characteristics.

The remaining laboratories appear to fall more or less into what might be called a fourth category of development-through-training. The Cooperative Educational Research Laboratory seeks to prepare persons for two new roles which will be facilitative of tested innovations; the Michigan-Ohio Laboratory is attempting to develop a program for training experienced teachers to engage in continued analysis and improvement; the Regional Educational Laboratory for the Carolinas and Virginia seeks to improve higher education by training personnel to apply institutional research and planning processes; and the Upper Midwest Educational Laboratory is developing new methods of teacher training.

Closer examination will show that all operations are mixed types and the important differentiation has to be made on the basis of the competence with which the task is pursued; and this, in turn, hinges largely on leadership and staff capability.

In speaking of leadership and staff capability I am thinking of both in relationship to research and development functions in education. Leadership which may produce acceptable results in the administration of schools or other agencies where institutional stability is high may be unequal to direction of an organization in which staff roles have to be worked out imaginatively and in which the operational emphasis is on continuous problem-solving and the development of components and systems. One of the requirements of leadership for research and development agencies is an ability to help a staff to move steadily toward better definition of intended outcomes or goals and toward closer specification of the resources and conditions essential to attain the postulated outcomes. In order words, problem-solving and development operations require leadership which is able to move through recurrent cycles from doubt and nebulousness, to precise formulation, to partial solution, to renewed doubt, and so on.

Staff capability also differs from that required for the operation of schools and similar educational agencies, largely because of the necessity in research and development for the collaboration of specialists grounded in relevant and complementary disciplines and technologies. Other kinds of criteria which may be applied legitimately to laboratory operations include the extent to which the governing board accepts and discharges responsibility for policy decisions, for the maintenance of effective leadership, and for the provision (within the limits of funds available) of personnel, facilities and other resources commensurate with objectives sought and the tasks incident thereto.

Examination of laboratory programs with respect to target groups reveals strong emphasis on the education of disadvantaged populations. At least nine laboratories focus on the culturally deprived or differentiated in reading and language arts programs; and seven programs in mathematics and science, and several in other subjects have similar foci. Five laboratories beam their teacher education efforts to this type of target; and three of these plus three others are studying learning behaviors of disadvantaged children. Moreover, seven laboratories are developing programs in educational planning, with special attention to the needs of those to whom existing schools seem poorly adapted. Improving the educational achievement of those handicapped in learning because of meager environments or other circumstances, therefore, is a major concern of many laboratories and an important goal of most. With regard to areas of curriculum and instruction, emphasis falls heavily on reading, language arts, mathematics, and science. All laboratories are giving attention to teacher education either as a means of achieving other goals or as an objective in its own right.

It may be noted that none of these approaches or programs is exclusive to the laboratories and that in fact all had been advocated, and to some extent developed, before the educational laboratories were established. What, then, is the contribution of the laboratories? It seems to me to be based on (1) the systematic development of these ideas and technologies; (2) their progressive adaptation to each other as components of systems for the attainment of educational objectives; (3) careful calculations and tests of the educational gains from installation of the new components and systems and the cost of the gains; and (4) prompt communication to other educational agencies of the information essential to effective use. These functions, to be sure, are shared with other agencies, but the laboratories appear especially adapted to providing the necessary linking mechanisms and to undertaking those processes to which other agencies find it difficult to give consistent and sustained attention.

Evaluation Procedures

The autonomy requisite to productive research and development can be reconciled with accountability for the use of public funds and other resources only through the establishment of orderly and effective processes of review and evaluation.

Office of Education personnel recognize their responsibility for exercising resourcefulness and sound judgment in increasing the beneficial effects of evaluation and easing burdensome requirements which threaten morale and effectiveness of the organizations which make up the National Program of Educational Laboratories. They have devoted much thought to the formulation of criteria for evaluation of the regional educational laboratories and the university-based research and development centers; and they have repeatedly sought the help of the National Advisory Committee and other groups and individuals, including members of the site visiting panels, in improving the criteria and the ways in which they are applied. The following commentary is offered, therefore, as a means of highlighting some considerations and problems incident to the application of criteria and not as a device for introducing new bases for judgment. There is no pretense that the criteria listed include all which are germane to evaluation of the centers and laboratories, or even all which are now used.

The importance of the mission, or goals, to which efforts are directed, undoubtedly is an important criterion; but is is difficult to apply as all of the centers and laboratories in one way or another are addressing themselves to important objectives, such as attempts to reduce the barriers to learning for those reared in poverty or otherwise excluded from fair access to education and other social benefits. Some approach this objective through the development of systems for the improvement of instruction in reading, language arts, mathematics, science and other fields; some through attempts to help teachers understand and adapt their behavior to the needs of disadvantaged groups; and others through studies of the effects of early childhood environments on motivation to learn and achieve. This by no means exhausts the approaches to this particular problem; but it serves to illustrate the point that many approaches may be valid if followed with requisite skill and imagination. The same thing may be said with respect to other kinds of missions and programs. My point is that a good case may be made for any of the existing sets of objectives; but this only raises the question of ability to realize the stated objectives. Among the factors which bear upon the likelihood of goal achievement are the quality of leadership, the capability of the staff as a whole, and the appropriateness and rigor of the program planning processes.

The quality of leadership may be inferred from such factors as: success in assembling a staff of persons with diversified and complementary talents which are adapted to the goals sought and the tasks undertaken; the amount of cohesiveness which has developed in the staff and the success of team efforts at problem-solving; the amount of progress made in program definition, including specification of intended outcomes and the resources and measures necessary to achieve them; the relationships with the governing board and other groups which shape policy--with particular respect to the amount and quality of information provided and the effectiveness of communication; and the performance level of the laboratory as represented by the rate of progress in attaining key objective.

While applying the criterion of leadership involves difficult subjective judgments, objectivity may be increased by drawing cautious inferences from the vitae of employees and consultants, and by independent examinations of planning processes, provisions for evaluation, and materials produced.

Staff capability relevant to the types of operations involved and outcomes sought is obviously of the highest importance for successful performance. While references were made above to staff capability as evidence of leadership, the importance of this factor justifies treating it separately. My observation is that the centers and laboratories with the highest capability tend to have several able staff members who have had a substantial part of their training and experience outside the field of professional education. Although many persons with high competence for research and development hold degrees from schools and departments of education, there is a serious question as to whether a staff composed predominantly of such persons is likely to be sufficiently bold, imaginative, and unorthodox in its approach, or qualified to bring the requisite analytical and technological expertise to bear on the problems encountered. Organizations engaged in curriculum development obviously need services of creative scholars in the disciplines underlying the subjects of instruction, as well as psychologists and other specialists. Those engaged in development of instructional management systems, use of computers or other sophisticated technologies, clearly need the services of specialists in computer technology, systems analysis, and planning processes.

The effectiveness of the planning processes may be judged by the clarity and specificity of objectives (especially by progress over time in the clarification of intended effects or outcomes); the extent to which viable alternatives are identified and weighed; the progress toward precise specification of the stages of research and development required for each program and project and the time and resources necessary at each stage; the extent to which there is rigorous analysis of the conditions essential to the postulated outcomes and the economic, social, and other costs of achieving the benefits sought; and the adequacy of the provisions for evaluation of both processes and products.

Another important factor is the extent to which fruitful relationships have been established with other agencies, especially: cooperative relationships with universities and other research organizations for the purpose of identifying knowledge relevant to laboratory operations and stimulating studies to fill gaps in knowledge; collaboration with university, and other research and development centers in the progressive refinement, testing, and diffusion of instructional and educational management systems and other products; close working relationships with state departments of education in formulating problems for study, in disseminating the findings of studies, in arranging field tests of materials and technologies, and in stimulating adoption of tested products and practices; collaboration with selected schools and school systems in problem solving, laboratory and field testing of systems and other products, evaluation and demonstration of programs and technologies, and diffusion of improved practices; and mutually supportive, or otherwise beneficial, relationships with other organizations, both educational and non-educational, which are engaged in activities which have demonstrated or potential relevance for education.

Efforts must be made to assess the quantity and quality of products at each stage of development. Instructional materials and other publications may be judged by their suitability for the intended consumers and the extent to which they are based on generalizations validated empirically or experimentally. Systems for instruction, instructional management, and administration can be evaluated in terms of demonstrated power to improve the operations which they are designed to affect; and technologies, processes, and strategies for innovative intervention by similar empirical evidence.

The provisions which laboratories and centers are making for evaluation of their own processes, operations, and products deserve the closest possible scrutiny. The validity, reliability and comprehensiveness of evaluation measures and the competence of the evaluators are important factors on which to base judgments of institutional effectiveness.

Another criterion which I believe applicable to educational research and development operations is the character of the provisions for continuing refinement of products--post-installation as well as pre-installation. Research and development in education will make its contributions for the most part through successively closer approximations to desired goals, and to reliable performance. "Reliable performance" is inavoidably a relative term, as complete predictability is not to be anticipated where the primary concern is with effects on the behaviors of individuals. A reasonable approximation to reliable performance may be said to exist when an instructional system or other educational product can be counted on to produce stated gains in learning or other achievements when used under specified conditions. Reports of gains or benefits from one or several experimental demonstrations do not meet this criterion unless experimentation has been sufficient to identify the whole set of conditions essential to realization of the benefits. In the case of education, the conditions specified must include such things as: the previous experience and other characteristics of the learners; the ways in which groups are organized for instruction; provisions for the selection, training and assignment of teachers; ways in which school experiences are related to out-of-school experiences; pre- and post- installation measures; and anything else which experimentation has shown may condition the success of the innovation.

One of the arguments for the establishment of more or less permanent laboratories is the hope that stable institutions, not dependent on income from sales and profits, can counteract the "arrested development" phenomenon to which reference was made previously. This will not happen, however, unless the expectation is firmly built into the evaluation process and the provisions for funding.

Questions have been raised repeatedly as to whether the present system (of quarterly and annual reports, annual formal site visits, and periodic visits by members of the Office of Education staff) is consistent with orderly planning and performance of research and development functions. Reporting, site reviews, and studies by independent groups sometimes impose such heavy burdens on the staffs of centers and laboratories as to seriously interfere with the performance of important tasks. Moreover, frequent reporting and evaluation procedures are difficult to reconcile with commitment to programmatic research and development which require a long time span. It is my conviction that once a center or laboratory has established its basic character and provided evidence of ability to plan, to govern itself, and to perform effectively the tasks to which it is committed, the frequency of formal on-site reviews may be reduced to intervals of three years.

Questions have also been raised regarding the composition of site visit panels. It is extremely difficult to obtain representation both of persons who are specialized in the problem area and in research and development organization and management. Dr. Alan T. Waterman, formerly director of the National Science Foundation, has suggested that in the case of research and development operations it may be helpful to conduct the review under two major aspects: (a) study of the programs per se, and (b) study of the management and organization of the agencies involved.

The application of criteria similar to those suggested above by a small panel of persons with competence in research administration and the management of public organizations might serve the purposes of institutional evaluation; and program evaluation might be performed by panels of experts who would look at the total federal research and development efforts in such fields as reading, mathematics and other curriculum areas, or in programs directed at particular types of learners. A beginning has been made in this direction.

Persistent Problems

There are a number of persistent problems which will continue to impose serious obstacles to effective research and development in education unless dealt with more decisively than in the past.

Comments have been made in the foregoing sections with regard to some of the problems associated with planning, program definition, staffing, and evaluation. Four other types of problems will be discussed here: those which arise from inadequate and short term funding, those caused by the present public-domain policy, those involving responsibilities for policy and governance, and those inherent in the paucity of verifiable theory and validated knowledge applicable to education.

Inadequate financing. The total federal funds now committed to the twenty-nine centers and laboratories is approximately thirty million dollars annually. This is utterly inadequate for the support of anything approaching a major research and development operation in a field as complex as education, which in one way or another involves not merely the one-fourth of the population engaged in formal schooling, but in actual effect the total society.

Some of the curriculum studies supported by the National Science Foundation required expenditures of the order of a million dollars a year for several years; and while they produced notable improvements in texts and other instructional materials, none was subjected to the extensive development and testing which are necessary for reliable performance. While precise calculations are not yet possible, there is reason to believe that the development, production, testing, and refinement of even a fairly limited instructional system, requires a staff of fifteen or more highly qualified specialists and generalists with a supporting technical and clerical staff. Special facilities are also required for experimentation, design of prototypes, production of components, assembly of components into systems, and rigorous testing at each stage of development. For best results it is necessary to involve substantial numbers of teachers, students, and other school personnel, and to work closely with the various organizations and groups which become sources of information or potential users of products. As the actual development of components and the fitting together of systems occurs, the annual cost for a single well designed program is likely to exceed a million dollars. If it is assumed that an organization will be engaged simultaneously in the development of three or more complementary programs or systems, the annual funding of the organization might easily exceed three million dollars.

This suggests that the present appropriation cannot be expected to sustain an effective level of operation of the present twenty-nine organizations. This may be considered an argument for reducing the number of organizations supported. If such a decision were made, however, it would quickly appear that there are many vital problems in education which are not receiving attention, and pressure would develop to increase the number of organizations or to add to the programs of existing organizations. In either case, it will be found that thirty million dollars is grossly inadequate annual support for educational research and development; and with increasing experience, it probably will be clear that those who originally talked of annual expenditures of one hundred million dollars a year, were, if anything, too modest in their estimates.

In addition to an increase in annual funds, it is imperative that ways be found of giving both laboratories and centers contracts and assurance of funding for periods long enough to permit long range planning and the development of staffs with the requisite capabilities. A minimum for this purpose would seem to be five years. Even if appropriations have to be made from annual budgets, it should be possible over time, to work out an arrangement, whereby each organization would be guaranteed minimal financing for at least three years in advance.

Public domain. Serious difficulties arise under the present public domain policy as it applies to materials and other products developed at educational laboratories and research and development centers.

One problem is that of quality control of products through the stages of development, testing, and refinement which should precede widespread diffusion. The education market is hungry for improved materials and other products, and commercial interests are alert to the advantages accruing to those who are first on the market with products which appear to have advantage over those in use. This could result in promotion of technologies and distribution of materials before they are developed to the point of reliable performance. Premature installation of less than thoroughly tested versions of instructional materials or other products of the laboratories and centers may seriously retard the acceptance of the better designed products anticipated at a later stage of development.

A second problem is that of making satisfactory arrangements for distribution of instructional materials and other products when they are ready for diffusion. An arrangement for distribution is not satisfactory unless it provides for continuing feedback of information regarding the effects produced and the difficulties encountered in use of the material with different types of learners under a variety of situations. To be really satisfactory, the arrangement for distribution should also provide that a reasonable share of any profits accruing are to be "plowed back" into further development by the originating center or laboratory.

A third problem associated with the present public domain policy is that of rewarding appropriately the investigators and developers responsible for producing the new systems or set of materials. This is especially crucial in university research and development centers where development is not highly valued in terms of salary, promotion, or academic prestige. The result may be that those who are most competent in the production of improved educational materials may prefer to work through commercial firms rather than through the laboratories and centers. If this happens, it will be hard to charge the new research and development agencies with the responsibility for continuing efforts to improve the products after they have gained initial acceptance.

The public domain policy also makes it difficult for private industry to undertake the production, diffusion, and installation of tested products because of the lack of any financial protection to cover the risks incurred in the final developmental and production phases. This problem was solved in some of the curriculum studies sponsored by the National Science Foundation by restricting production to a single firm for a short period of years. No such arrangement appears open to the laboratories and centers under existing contracts.

Freedom and responsibility. Both centers and laboratories were established with federal funds, and few would survive a discontinuance of such funding; yet they were conceived, not as parts of the government, but as largely autonomous organizations capable of wise choice of appropriate means to the achievement of the broad purposes for which they were founded. The proper concern of all of the many parties who share in the making of decisions which affect the functioning of these organizations, therefore, is that the fullest possible contribution be made to the public purpose of improved education for individuals in our society. The furtherance of this purpose through research and development requires the coordination of many diverse and highly specialized abilities; and it is well established that persons with the requisite knowledge and abilities have a low tolerance for external controls.

Unless conditions of employment protect the freedoms essential to imaginative, well-designed, and sustained research and development, the centers and laboratories cannot hope to develop the staff capabilities necessary to effective performance. Present control of the employment and dismissal of personnel appears adequate; and the centers can offer continuity of employment and the promise of tenure through university appointments; but the laboratories are handicapped in this respect because of annual contracts. Perhaps the most important factor in staff morale is a sense of self-direction. This undoubtedly is associated with high performance--both as cause and effect; but it also reflects confidence in leadership and in the support of the essential freedoms by the governing board or sponsoring university.

In the long run these freedoms, if ineptly used or weakly defended, are subject to the same kinds of attrition as other rights used irresponsibly; and continued exercise of the freedoms requires both a disposition to behave responsibly and a workable system for the distribution of authority and controls. In the distribution of authority, the needs, the legitimate claims, and the duties (including but not confined to legal obligations) of many parties have to be considered. It will not do to confine attention to a simple Office of Education and laboratory-center equation. Among the parties at the federal level directly and often crucially involved in the decisions which determine basic policies, modes of operation, and effects achieved are The Congress, through enabling legislation, appropriations, and Committee influence on federal administrators; the Office of Education as the immediate federal agency of administration, particularly through the officers of the Division of Educational Laboratories and the Bureau of Research; the Department of Health, Education, and Welfare and the Bureau of the Budget through their action on Office of Education recommendations. On the other side of the table, so to speak, are the governing boards of the laboratories and the university officials and committees to whom the centers report; and the staffs of the several organizations.

All of these policy--groups--federal, regional, and local--operate in accordance with their perceptions of the public interest, and the real constituency of all is the American people and not a particular institution or region. I make this assertion not merely because the support comes from federal sources, but also because I can find no identifiable regional or local constituency which the governing bodies represent. The most crucially affected party in all educational enterprises consists of the individuals to be educated; and the advancement of this interest is a prime obligation of all policy-making groups. The Congress represents the people, however, as taxpayers as well as learners and as consumers of many services other than education. Members of governing boards even when professionally associated with education are not close students of learning behaviors under a sufficient diversity of circumstances to be sensitized to how environmental factors and socially determined norms affect motivation for and success in learning.

Of all the parties involved in decision making for the centers and laboratories, I would nominate the staffs of the several organizations both as most influential and most likely to understand the conditions affecting learning. In the laboratories and centers as in other enterprises requiring highly specialized abilities, authority for decisions tends to lodge with a collegium of key staff members. This is true because the authority of knowledge has to be honored if work is to be productive. It may also be observed that as staff expertise increases, it becomes progressively more difficult to communicate all of the information necessary for sound decisions to those not involved in day-to-day planning and operations.

Certain dangers inhere in what basically is a sound impulse toward staff self-government. One of these is a tendency toward a narrowing view of alternative ends and means. This is counteracted successfully by the better managed laboratories through skillful use of outside consultants and a variety of advisory groups. Another danger is that the public interest will be perceived too largely in terms of the professional ethos or the preferences of staff members. The best antidote for this type of myopia is a governing board or other policy making body which demands from its director and his staff adequate information on alternative strategies and programs, insists on further study when indicated, and accepts responsibility both for the formulation of policy and for effective staff performance. This underscores the importance of including on the policy-making boards, persons who view the public interest and needs for education from a variety of occupational, cultural, and socio-economic perspectives. It likewise emphasizes the importance of members sufficiently interested in the improvement of education through research and development to take seriously their responsibilities as board members.

The abler executive directors of the several organizations for the most part are aware that boards tend to function effectively only when the director and his staff are diligent in exposing the advantages and disadvantages, the probable costs and benefits, of alternative courses.

The lack of control over finances inherent in short-term contracts and the consequent necessity for frequent justification of budget requests are a source of irritation to many boards and a potential threat to the autonomy requisite to effective performance. The Office of Education staff is discharging with due moderation and increasing wisdom its inescapable responsibility for productive use of funds committed; and longer term contracts might serve to reduce the tension between the contracting parties to a level consistent with high performance.

Weak knowledge base. Examination of products already developed or ready for development suggests that the basic capital of ideas and empirically tested knowledge available for use in educational research and development is uncomfortably small. If this were not so, it is unlikely that so many of the laboratories would be centering their developmental activities on linear programming of instruction, micro-teaching, and interaction-analysis instruments, which, despite their undoubted merits, scarcely constitute a full range of the potentially powerful means to improved educational practice. Most of the centers and several of the laboratories are themselves contributing knowledge on teaching, learning, and the organization of educational institutions; and their constant search for additional knowledge should have a stimulating effect on research communities in the universities and elsewhere.

To speed up the increase of conceptual capital for applied research and development, consideration might be given to funding a number of institutes, centers, or laboratories capable of concentrating a rich variety of interdisciplinary and technical talent on problems critical to education which are not yet receiving adequate attention. For example, longitudinal studies of how learning is affected by the level and quality of information available and the ways in which it is presented might be conducted by carefully selected teams of information and communications theorists, experimental psychologists, linguists, and others. Similarly, the diverse and cumulative effects of school and non-school environments on self-concepts and motivation to learn might be studied by teams of ecologists, neurologists, psychiatrists and other biological and social scientists. A team to identify the crucial determinants of the frequency and power of reconstructive or "peak" learning experiences and to discover how these experiences are related to incremental learnings might include philosophers as well as psychologists and biological scientists. Studies of the structural and interpersonal characteristics of educational organizations which renew themselves and promote the growth of their members through continuing attention to unmet needs and unsolved problems might be undertaken by teams which would include sociologists, political scientists, economists, historians and other students of the functioning of human institutions.

Whether or not such special institutes are established, the need will still exist to stimulate a variety of basic research on human ecology and human behaviors by generous research grants and increased support for the training of researchers interested in applying the methodologies of other disciplines to the study of education (or of devising new and fruitful research methodologies and techniques for educational studies).

CONCLUSIONS

The findings of my study of the twenty educational laboratories and the nine university research and development centers are embedded in or foreshadowed by the preceding observations; but I wish to give explicit expression in this section to some of the conclusions to which the two-year study has led:

The National Program of Educational Laboratories is evolving into a functioning system with demonstrated power, and great potential, for the improvement of American education.

The experiences of the centers and laboratories have clarified the meaning of research and development in education; and illuminated the requirements for effective performance. A majority of the twenty-nine organizations within their brief life span of two to five years have developed well designed and workable strategies and systems for adapting knowledge and technology to educational use. Increased sophistication in planning is producing better program definition, sharper analysis of alternatives, and closer specification of operational procedures.

Collaboration in solving common problems is increasing through both formal and informal arrangements involving various combinations of laboratories and centers. Although flexibility is sufficient to allow each organization to capitalize on its unique strengths for research, development, and diffusion, a rough division

of labor is occurring--with centers typically giving emphasis to problem-oriented research eventuating in conceptual models and prototypes, and the laboratories assuming a large share of responsibility for the later stages of development and field testing. Communication has improved markedly not only among centers and laboratories, but also with a large variety of educational and education-related organizations; and dissemination of knowledge and other products is being expedited through the Educational Resources Information Center and directly through better planned publications, conferences and workshops.

The modest investment in the laboratories and centers already has produced good returns and revealed possibilities for increasing the returns from all educational expenditures.

For example, the knowledge and instructional systems developed by several centers and laboratories are being applied with good effect to the education of migrant, Spanish-speaking, Indian, Eskimo, and other populations for which traditional curricula and instruction have proved inappropriate; and instructional materials and systems in language arts, mathematics, science, and other subjects are undergoing tests and refinements which promise superior performance. Moreover, substantial contributions are being made to the concepts and practice of pre- and post- employment teacher training; ways of relating school to out-of-school experience are being worked out in metropolitan and rural areas; and systems and strategies are being devised to improve pre-school education and to reduce the detrimental effects of impoverished environments. In short the findings of many kinds of research are being more thoroughly and more quickly incorporated into educational practice; and many school systems and several state departments of education are looking to centers and laboratories as a source of knowledge and tested innovations.

The best way to realize continuing and enlarged gains from educational research and development is to conserve and build upon the strength that has been developed by the centers and laboratories which have shown that they can produce and which are making the greatest progress in improving their operations.

The concept of systematic and continuous research and development in education was poorly understood when the centers and laboratories were established; and there was little previous experience to draw on for models, as those derived from other fields are based on presuppositions which do not hold fully in education.

It would be folly to disrupt or slow down those organizations which are steadily moving toward mastery of the complex elements involved in any fundamental improvement of education. The influence of many of these organizations already is nationwide and several are attracting close attention from other countries because of their products and their ways of working.

Failure to provide the more successful and capable of these organizations with expanded support will be interpreted as evidence that the American society is not ready to apply to education the careful and elaborate processes for the production and application of knowledge that have proved so fruitful in agriculture, medicine, space exploration, and weaponry. If, for any reason, the current promising beginnings in educational research and development are allowed to falter, it will be exceedingly difficult to mount an equally successful effort in the foreseeable future.

This is not an argument for continued support of operations of dubious value or organizations of low performance. On the contrary, it undoubtedly will prove detrimental to continue support of those organizations which fail to prove themselves after a reasonable period.

Several matters require prompt attention in order to realize the full potential of center and laboratory types of organizations for contributions to innovation, and to the necessary reconstruction and reform of educational institutions and practices.

Some of the measures necessary to improve functioning can and should be taken by the centers and laboratories severally. One of the most important of these is to add additional talents and methodological competence to achieve a better balance in staffing. The present laboratory staffs tend to have a high percentage of persons trained and experienced in educational administration. Such disciplines as anthropology, linguistics, psychology, sociology, and statistics are less well represented on most laboratory staffs. The newer disciplines of information processing (and theory), system analysis, and program planning are likewise underrepresented in most laboratories. Even curriculum specialists and creative teachers are not found as often as might be expected. With notable exceptions, the centers tend to rely on educational psychologists and curriculum specialists more heavily than on scholars from basic disciplines. Some have not succeeded in bringing to bear on the problems with which they are wrestling the rich resources of talent theoretically available in universities. Progress is being made in improving the staff "mix" and in on-the-job development of staff; but further efforts in these directions are in order by both laboratories and centers.

Much the same observations may be made in regard to governing boards and advisory groups. In all but a few cases, there would be great advantage in bringing in points of view not now well represented. A wider representation of research communities might bring important new perceptions and considerations to bear on policy and operational strategy; and the same may be said for occupations and socio-cultural groups which at present lack effective spokesman on boards and committees. Artistic and humanistic points of view likewise deserve effective representation.

Another measure largely under the control of the centers and laboratories collectively is a strengthening of the network of communications and collaborative effort among these organizations, with the several scholarly disciplines, with institutions preparing teachers, with state departments of education, with professional groups, and with many other organizations capable of illuminating or participating in educational research and development.

There are other measures which require action by the federal government, which is, and must remain for many years, the major source of funds and, hopefully, a bulwark of policies essential to sound operation and productivity. Among these is the removal from contracts (and enabling legislation when necessary) of provisions which interfere with legitimate autonomy and flexibility in arranging for the diffusion and continuing refinement of products. Another is some form of advance or forward funding to provide the stable expectations essential to good planning, adequate staffing, and effective program development. Still another is continuing effort by the Office of Education staff to improve evaluation and reporting. Among other things, this requires retention of as many as possible of the able and dedicated staff members who within the past two years have markedly increased their knowledge and effectiveness in administering research and development programs.

A much higher level of funding needs to be established for successful centers and laboratories. Many of the centers are urgently in need of increased funds to strengthen their staffs and add badly needed facilities. The need for larger funding is even more urgent as products become ready for extensive development and field testing. The stronger laboratories undoubtedly could make excellent use of annual budgetary increases of 20 to 50 per cent over a period of several years.

An appropriation of funds for buildings and other permanent facilities for laboratories and centers was included in the congressional authorization; but the funds have been frozen because of a combination of circumstances. An early decision to provide such facilities for the most firmly established and effective organizations would be a clear and important "go ahead" signal for educational research and development.

Successful research and development in education is, and will continue to be, both a science and an art; and qualitative assessments often are more relevant than quanitative measurements.

The centers and laboratories are employing science and engineering techniques wherever they seem appropriate to the understanding and improvement of education; but they also are learning something of the limitations of these approaches in solving the more complex problems involved in adapting education to the needs of individuals caught in the cultural whirlpool of contemporary life. In the most exciting and productive of these new organizations, I detect a judicious and lively mixture of science and art.

There is a relentless effort to be analytical and precise in describing relationships, inferring probable consequences of proposed changes, and measurement of effects; but there is also a sharpened awareness that for successful intervention in education, science has to be married to art. The adaptation of education to human needs requires imagination as well as analytical skills, sensitivity to feelings even more than exact measurement, and artistic perceptions as well as scientific inquiry. The ethics of science must be fully respected; but technologies for change must also meet the test of their consequences for individual autonomy, self-esteem, and spontaneity.

Appendix A

Schedule of Investigatory Activities

Activities Associated With Study by Francis S. Chase of the

NATIONAL PROGRAM OF EDUCATIONAL LABORATORIES

Dates	
1966	
Nov. 18	Conference with HEW Secretary John Gardner, Commissioner of Education Harold Howe II and others. Acceptance of the invitation to undertake overview of the National Program of Educational Laboratories.
Nov. 19	Presentation of concepts of educational research and development to meeting of the Office of Education Research Advisory Council.
Nov. 30	Conferences in Washington with members of the OE staff and officials of the Bureau of the Budget with regard to problems emerging in the administration of the laboratory program.
Dec. 1	Contract signed by the Office of Education and the University of Chicago to cover cost of the Chase Study.
Dec. 2-5	Visit to Center for Urban Education, New York City.
Dec. 6-7	Visit to Educational Development Center, Newton, Mass. (At that time known as Institute for Educational Innovation)
Dec. 8-9	Visit to Research for Better Schools in Philadelphia.
Dec. 12	First interim report mailed to Commissioner Howe setting forth impressions from early visits.
Dec. 13-14	Visit to Northwest Regional Educational Laboratory in Portland, Oregon.
Dec. 15	Visit to Far West Laboratory for Educational Research and Development, Berkeley, California.

Dates	
1966	
Dec. 16	Invitation extended to a group of selected consultants for a seminar based on available data concerning the laboratories.
Dec. 17-19	Visit to Southwest Regional Laboratory, Los Angeles, California.[1]
Dec. 20	Conferences in Washington with Secretary Gardner and Commissioner Howe, and subsequent conferences with the OE laboratory staff for discussion of observations made on visits to the laboratories.
Dec. 28-29	Visit to Central Midwest Regional Laboratory, St. Ann, Missouri.
Dec. 29-30	Visit to Southeast Educational Laboratory, Atlanta, Georgia.[2]
1967	
Jan. 2	Conference[3] in Chicago to discuss and analyze the Investigator's impressions of the first month of study.

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[1] Oscar Chute, formerly Supt. of Schools in Evanston, Illinois, accompanied the Investigator on the visits to the West Coast laboratories between Dec. 13 and 19.

[2] H. Thomas James, Dean of the School of Education at Stanford University, participated in the visits between December 28 and 30.

[3] Conference participants included distinguished educational researchers and others who had played important parts in the formulation of national policies on education and contributed ideas which were incorporated into the Elementary and Secondary Education Act of 1965. It also included persons with wide experience in educational administration at local and state levels and Deans of three of the stronger schools of education. In alphabetical order those in attendance were: Stephen K. Bailey; Benjamin S. Bloom; Roald F. Campbell; Oscar Chute; Lawrence A. Cremin; Luvern Cunningham; Martin W. Essex; Jacob W. Getzels; Egon Guba; Philip Kearney; Kenneth J. Rehage and Herbert A. Thelen.

Dates	
1967	
Jan. 4	Letter to Commissioner Howe to report additional impressions from visits to the laboratories and conversations with informed persons.
Jan. 5	Visit to Eastern Regional Institute for Education, Syracuse, N.Y.
Jan. 6	Visit to Michigan-Ohio Regional Educational Laboratory in Detroit.
Jan. 10	Full day of conferences with Secretary Gardner and Under-Secretary Wilbur Cohen; Commissioner Howe and Associate Commissioners Louis Bright and Graham Sullivan; William Cannon of the Bureau of the Budget; and others.
Jan. 11	Visit to Central Atlantic Regional Educational Laboratory in Alexandria, Virginia.
Jan. 15	Address to Chairmen of Regional Laboratory Boards, Directors and selected staff members at New Orleans, Louisiana. (Appendix B)
Jan. 17-18	Visit to Southwestern Cooperative Educational Laboratory, Albuquerque, New Mexico.
Jan. 19	Copy of New Orleans address mailed to Laboratory Directors, Board Chairmen and OE staff with request for criticisms.
Jan. 19-20	Visit to Southwest Educational Development Laboratory, Austin, Texas.
Jan. 22	Letters to members of the National Laboratory Advisory Committee suggesting issues for discussion.
Jan. 23-24	Visit to Appalachia Regional Educational Laboratory, Charleston, West Virginia.
Jan. 25	Visit to Regional Educational Laboratory of Carolinas and Virginia, Rougemont, North Carolina.
Feb. 10	Statement of tentative conclusions mailed to members of Advisory Committee, Laboratory directors and OE staff.

Dates	
1967	
Feb. 17	Meeting of National Laboratory Advisory Committee.
Feb. 18	Joint meeting of National Laboratory Advisory Committee with Research Advisory Council.
Feb. 20	Visit to South Central Regional Educational Laboratory, Little Rock, Arkansas.
Feb. 27-28	Visit to Upper Midwest Regional Educational Laboratory, Minneapolis, Minnesota.
Mar. 3	Visit to Cooperative Educational Research Laboratory, Northfield, Illinois.
Mar. 6-7	Visit to Mid-Continent Regional Educational Laboratory, Kansas City, Missouri.[4]
Mar. 8-9	Visit to Rocky Mountain Regional Educational Laboratory, Denver, Colorado.
Mar. 15	Technical Progress Report sent to Office of Education.
Apr. 3-5	Meetings in Washington with Commissioners Howe and Bright, OE staff, and Executive Committee of Laboratory Directors.
Apr. 14-15	Meeting of National Laboratory Advisory Committee in Washington.
Apr. 16	Memorandum to laboratory directors.
Apr. 24	Letter to National Laboratory Committee members in regard to matters requiring attention at May 12-13 meeting.
May 9	Kjell Eide arrived to assist in study of planning processes used by the laboratories.
May 12-13	National Laboratory Advisory Committee meeting in Washington--name changed to National Advisory Committee on Educational Laboratories.

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[4] Stephen Bailey, member of the Advisory Committee and Dean of the Maxwell Graduate School at Syracuse University, participated in this visit.

Dates

1967

May 19	Memorandum to laboratories regarding agenda of National Advisory Committee meeting.
June 9-10	National Advisory Committee meeting in Washington.
June 15-16	Participation in discussions at Conference with Research and Development Center Directors in Madison, Wisconsin.
July 9	Eide Study completed. (Summary of report in Appendix C was sent to all laboratories and to OE staff members).
July 13	Memorandum to Commissioner Howe regarding laboratories.
July 14-15	Meeting of National Advisory Committee in Washington.
July 26	Visit to Northwest Regional Educational Laboratory, Portland, Oregon.
July 27-28	Visit to Center for Advanced Study of Educational Administration, University of Oregon, Eugene, Oregon.[5]
Aug. 3	Visit to Wisconsin Center for Research and Development for Learning and Reeducation, University of Wisconsin, Madison, Wisconsin.
Aug. 7	Letter to R & D Center Directors requesting information and giving purpose of visits.
Aug. 15-16	Conference in Washington with OE and Bureau of Budget officials.
Sept. 22	Memorandum to members of the National Advisory Committee regarding conference on Oct. 5-6.
Sept. 25	Visit to Research and Development Center in Educational Stimulation, University of Georgia, Athens, Georgia.

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[5] Daniel Griffiths, Professor of Education and Dean, New York University, School of Education, participated in this visit.

Dates	
1967	
Sept. 26	Return visit to Southeastern Educational Laboratory, Atlanta, Georgia.[6]
Sept. 28-29	Return visit to Southwestern Educational Development Laboratory, Austin, Texas.
Oct. 5	Presentation of views to Conference in Washington of Laboratory Directors and Board Chairmen with OE staff and chairmen of visiting teams.
Oct. 6-7	Meeting of National Advisory Committee in Washington.
Oct. 12	Visit to Center for Study of Evaluation of Instructional Programs, UCLA, Los Angeles, California.
Oct. 13	Return visit to Southwest Regional Educational Laboratory at Inglewood, California.
Oct. 20	Meeting with membership of the Central Atlantic Regional Educational Laboratory in Alexandria, Virginia.
Oct. 26	Visit to Center for Research and Development in Higher Education, University of California, Berkeley, California.
Oct. 27	Return visit to Far West Laboratory for Educational Research and Development, Berkeley, California.
Nov. 7	Conference in Washington, D.C. with Associate Commissioner Louis Bright; Director of the Division of Educational Laboratories, Norman Boyan; Ward Mason of the Division of Educational Laboratories; and Center Directors, Bush, Findley, Glaser, Klausmeier, Pellegrin and Wittrock.
Nov. 30	Visit to Learning Research and Development Center, University of Pittsburgh, Pittsburgh, Pennsylvania.
Dec. 7	Visit to Center for Study of Social Organization of Schools, Johns Hopkins University, Baltimore, Maryland.

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[6] Francis A. J. Ianni, Professor of Education, Teachers College, Columbia and formerly Associate Commissioner of Research, U.S. Office of Education, took part in the visits of September 25 and 26.

Dates

1967

Dec. 8	Conference with OE staff in Washington, D.C.
Dec. 19	Return visit to Central Midwestern Regional Educational Laboratory, St. Ann, Missouri.

1968

Jan. 5-6	National Advisory Committee meeting in Washington, D.C.
Jan. 13	Return visit to South Central Regional Educational Laboratory, Little Rock, Arkansas.
Feb. 29	Statement to the Secretary of HEW and the Office of Education.
Apr. 16	Additional information requested from laboratories.
Apr. 19	Conference at Office of Education.
May 9-10	Return visit to Michigan-Ohio Regional Educational Laboratory.
May 24	Return visit to Upper Midwestern Regional Educational Laboratory.
May 31	Return visit to Research and Development Center, University of Georgia, Atlanta, Georgia.
June 4	Return visit to Northwest Regional Educational Laboratory, Portland, Oregon.
June 6-7	Presentation and participation in discussions at Conference of R & D Centers Directors at Pittsburgh, Pennsylvania.
June 11	Conference in Chicago with Drs. Gilchrist and Neff of the Mid-Continent Regional Educational Laboratory.
July 2	Meeting in Washington with OE staff.
July 12-13	National Advisory Committee meeting in Washington.

Dates	
1968	
July 22-23	Conference of Laboratory Directors in Portland, Oregon.
Aug. 29	Eight-page letter to Commissioner Howe dealing with (1) conserving and augmenting the power for productive educational research and development now evident in the stronger centers and laboratories and (2) ameliorating conditions which tend to retard realization of the full potential of the National Program of Educational Laboratories.

Appendix B

THE EDUCATIONAL LABORATORIES: HOW DO THEY FIT INTO THE FUTURE OF AMERICAN EDUCATION?

Francis S. Chase

New Orleans Meeting of the Laboratory Directors
January 15, 1967

My intent is not to pass judgment on the laboratories; but to ask you to rethink with me the role of the laboratories in American education and how this role may be played to greatest effect.

For the past two months the laboratories seldom have been absent from my thoughts except in sleep, and not always then. I have discussed these new institutions with everyone whom I could engage in conversations and have probed in every way I know to extract the essential meaning of these new institutions which have appeared on the American educational scene as an important piece of the apparatus created by the Elementary and Secondary Education Act of 1965. Those with whom I have conferred and argued include scholars from a number of disciplines in the academic community, state superintendents of public instruction, school administrators and teachers, and numerous others concerned with the advancement of education. Included among those with whom I have talked are several who took leading parts in the Task Force which enunciated the basic ideas later incorporated in Public Law 89-10, the Government officers responsible for administration of the National Laboratory Program and the laboratory staff in the Office of Education, members of the special panel chaired by Professor Cremin, and members of the boards and staffs of more than half of the regional laboratories.

Out of these conversations a number of conclusions are beginning to emerge and a number of sharp questions to protrude. These I wish to share with you before the first meeting of the National Laboratory Advisory Committee is held at the end of this month. I beg you to subject them to the sharpest possible scrutiny, to expose any errors of fact or weakness of logic, and to help me correct my present imperfect perception of what the laboratories are and what they may become.

The evidence which I have examined suggests that the funds already committed to the laboratories will bring returns that compare favorably with those from other expenditures within this decade which have been designed to produce construtive change in education. There is no reason to doubt that the laboratories are engaging in activities which are useful in their own terms and which may be expected to make at least modest contributions to the adoption of innovative practices, to the improvement of the morale of those engaged in teaching and administration, and some measurable increase in educational achievement.

As yet, however, only a small number of laboratories have moved with any definitiveness to supply the need for programmatic research, rigorous "field testing" of research findings, or the engineering of components for the "systems" approach to education. Moreover, weaknesses built into the structure, the staff and the choice of activities by many of the laboratories threaten to reduce the prospect that their performance will differ significantly from existing educational institutions. One penetrating critic has said:

> ...that most of the laboratories are projecting their activities on the basis of unwarranted assumptions; that they are poorly organized to carry out their mandates;...and that they have projected programs which are pedestrian and which will tend merely to 'repair' the most obvious deficiencies of American education without doing much to change the educational enterprise in any basic ways.

In my opinion this criticism is unduly harsh for most of the laboratories. I would say that considering the short lapse of time since the laboratories have been funded and the presence of conditions which interfere seriously with orderly processes of planning and staffing, it is little short of remarkable that so many of the laboratories (1) have achieved a defensible definition of functions and goals, (2) have built the nuclei of staffs of considerable promise, and (3) are demonstrating that they can make contributions which may enable all parts of the educational enterprise to perform more effectively. I also am inclined to think that several laboratories are engaging in dubious activities and have become the prisoners of mistaken concepts of regionality, or self-defeating attempts to address themselves to everyone's perceptions of needs, and of "entangling alliances" of various kinds. Let me expose to you the assumptions that lie back of these harsh judgments.

Within the last several decades there has been a considerable amount of research which illuminates the evolution and functioning of educational institutions and provides implications for learning, teaching, and the administration of education. In his presidential address to the American Educational Research Association in Chicago last February, Professor Benjamin S. Bloom named several areas in which he believes ways of thinking about educational phenomena have been altered by crucial studies. Reflections on the new knowledge to which Professor Bloom refers suggests, however, that much of it is not yet available for application to teaching or school administration. It has not been incorporated to any great extent into materials or instruction; it has not yet produced discernible change in most programs of teacher education; and most of it has not been put into forms that provide much guidance for organizing schools, grouping learners, or adapting instructional techniques to individual differences. The point is that the discovery of new knowledge does not make it immediately available to those engaged in the practice of education. The same thing can be said of new technologies of communication, data processing, and instruction. Educational availability cannot be measured by the possibilities inherent in the computer or other technological device until the applications to instruction are carefully worked out and tested under a variety of conditions; and the potential cannot be realized until other elements are modified so that the new technology becomes part of a consistent system.

In contrast with such fields as agriculture, engineering, and medicine, education has lacked precise technologies both for investigation of needs and for instrumentation of reforms. There have been serious gaps in the processes through which new knowledge and technologies have been adapted to use by schools and other educational agencies and subjected to rigorous testing under a variety of life situations. In short, there has been little that can be dignified by the name of applied science in the field of education.

The laboratories offer a hope of remedying this lack, provided they can be helped to specify with some precision the kinds of changes--products or processes--to which their efforts are directed, the stages and instruments through which the ends are to be attained, and the proximate inputs of time, talent, and other resources required for each development. It seems to me these developments would be more likely if each laboratory were to select one or a small number of programs so that the necessary attention might be given to the refinement of strategies of intervention and the building of the requisite instruments and staff competence through which to test the selected strategies and tactics, to monitor the operations of the new systems, and to exercise quantity and quality controls over the output.

By functioning along the lines described, the laboratories might provide the new elements to make the American educational enterprise operate more nearly as a system of reciprocating parts. The public and non-public school systems, the several institutions of higher education, the state departments of education, and voluntary educational agencies of many kinds now function largely as discrete units which engage with each other intermittently or incidentally. The laboratories might be designed to mesh continuously both with the producers of theory and research and the potential consumers who are responsible for instruction and the operation of educational agencies. If so, contributions to the effective functioning of other educational agencies would be incalculable. Scholars would be able to improve their research and theoretical formulations as a result of the feedback from the laboratories; knowledge of the kinds of experiences required to enable teachers to adapt their behavior to new conditions might force radical changes in both the initial and continuing education of teachers; state departments of education would be able to regulate, consult, and advise on the basis of tested information and technology; and schools of all kinds would have a much clearer view of how to bring about the desired changes in education.

It appears that the conditions necessary to the development of laboratories along the lines indicated have not yet been established. In fact many of the conditions under which proposals were prepared and funding authorized were such as to create diffuseness of objectives, attempts to meet a host of conflicting expectations, and a frantic rush to employ staff and get into operation without adequate planning. It will serve little purpose to assign credit for the strengths which the laboratories exhibit or blame for their weaknesses; but it is important without further delay to create the conditions which will help them realize as fully as possible the potentialities of the concept which underlies their establishment. Some of the conditions which seem essential are discussed below.

There is a pressing need for a set of descriptive terms which will convey the distinctive functions and operational strategies of the educational laboratories without restricting arbitrarily the choice of activities essential to the performance of functions. Support of the laboratories by those who provide the essential resources, and by the organizations and persons which they seek to help and on which they must depend, requires a common concept which clarifies the ways in which the laboratories complement the work of existing educational institutions and agencies and the kinds of contributions to be expected from them. Until there is a set of communicable concepts or descriptive terms which are shared by and acted upon by the responsible government officials, the staff of the Office of Education, the boards and staffs of the several laboratories, and the agencies and persons with which they need to work, there is a danger that the laboratories may be seen as intruding on the jurisdictions of other agencies and/or as institutions so poorly defined as to be innocuous. In view of the fact that the twelve operational laboratory contracts were negotiated as late as May, 1966, it is remarkable how much progress several of the laboratories have made toward achieving distinctive identities. Over a period of a few months notable progress in the specification of both goals and processes has taken place in at least five or six of the laboratories; and attempts at closer specification of objectives, programs, operating procedures, and staff competencies are observable in most of the laboratories. This process needs to continue with the help of able consultants, who themselves have thought deeply about the laboratories, and who are agreed among themselves and with the leadership of the Office of Education with regard to the essential character of the new institutions. It is hoped that the necessary definitions will emerge as a product of conversations among the several parties concerned with the development and functioning of the laboratories and will reflect the strategies and program definitions which seem to underlie the most promising developments to date.

Criteria for the guidance and evaluation of the laboratories need clarification to avoid confusion by what appear to be mixed signals. It is evident that some of the laboratories find it difficult to decipher the meaning of the directives and suggestions which they are receiving from the Office of Education; and some of the suggestions do appear to be at cross purpose with each other. Two kinds of perceptions of what is expected seem to me to have produced effects that are dubious, if not downright damaging to the effective development of the laboratories. The first is that the program should represent a response to the needs of the region as ascertained from the persons concerned. Related to this is the perception that the laboratory will be judged by the number and diversity of occupations of the persons involved. Both of these have contributed to the diffuseness which is found in the programs of many of the laboratories; and both contribute to the frantic effort to "bring help" even before there has been any adequate diagnosis of the problems or any formulation of a method of dealing with them. Another kind of perception which has operated to retard sound development is the idea that the laboratories must almost immediately have something to "show and tell". This has led to mounting programs without adequate planning and to recruiting staff without sufficient attention to the qualifications required for substantive contributions over an extended period.

It is my conviction that the laboratories must establish themselves by what they demonstrate, not by whom they involve. Widespread involvement of persons and agencies is no substitute for the development of soundly conceived and carefully developed efforts to produce understanding of how improvements in education can be achieved. Moreover, the desire to please many, or special, constituencies may interfere with development of institutional integrity and power. Laboratories are in danger of becoming captives of particular points of view emanating from powerful school systems, state departments of education, or universities unless the governing boards can concentrate on defining the distinctive character of the laboratory and its relationships to other institutions. Too much courting of existing agencies may result in failure to develop new points of view and new cutting edges in education, and make the laboratories errand boys for other institutions or lead them to expend their energies largely for their own preservation. They might even come to resemble weak schools of education without students.

The indispensable prerequisite for both training and service activities is the development of tested technologies and specialized staff competence. The attempt to provide training of teachers or other personnel or to offer evaluative and consultative services without relating such training and service to the development of specialized staff competence and technologies will mean that the laboratory becomes simply another educational agency functioning on the basis of opinion and the "conventional wisdom" derived from experience.

It is my contention that as new institutions brought into being by the promise of Federal funds, the laboratories are entitled to reasonable support through their infancy without having to spend talent and energy in seeking grants and contracts. The character of the new institutions is not likely to be soundly formed if they are tempted to enter into contracts for services in order to pay their staffs and other expenses. All the early energies are needed to achieve identity and lay the foundation for distinctive contributions to education. They will mature more rapidly if they do not have to turn aside from essential tasks to raise money either because of shortage of funds or to protect their autonomy.

Long-range planning, stability of staff, and orderly program development are difficult to achieve when funding is on a short-term basis and budget processing is tortuous or delayed. Several of the laboratories have been remarkably successful in attracting highly qualified persons who value the possibilities they see in the laboratories sufficiently to take the risk of short-term contracts. The risk will become intolerable, however, unless it can be reduced by effective performance. It is necessary that the laboratories provide a basis for confidence through a discriminating delineation of functions, responsible direction and policy making, the employment of competent staffs, and initial progress on significant problems. Once the basis for confidence is established for a laboratory, however, it has the need, and the right, to feel itself "master of its house"; and this it cannot do if autonomy is granted grudgingly or funding is inadequate.

There is no doubt that the President, Secretary Gardner, Commissioner Howe and all Government officers concerned with the laboratories want very much to see the laboratories succeed. They are pleased with evidence of effective functioning; but they are also alert to any signs that the power of the laboratories is being dissipated in activities of small promise or functions that might be as well performed by older educational agencies. The ablest educational leaders in the country appear to have similar views; and the severity of some of the criticism leveled at the laboratories springs from the overwhelming importance attached to effective performance by the laboratories of essential functions which are now neglected.

Many of those with whom I have talked are beginning to raise questions which I believe deserve your studious consideration, questions which already are receiving attention in the Office of Education, and questions which undoubtedly will be discussed thoroughly at the meeting of the National Laboratory Advisory Committee on January 28 and 29 and at the subsequent meeting of the Research Advisory Committee.

One of the questions that comes up in various forms is "How many laboratories should be supported for the next four or five years?" This question sometimes arises out of certain assumptions regarding the level of funding, but more often arises from concern that there may not be enough highly developed talent to permit effective operation of more than five to ten laboratories until additional talent can be developed through research training programs and the training offered by the laboratories themselves. There are many thoughtful persons who share this view and who would argue, therefore, for the discontinuance of the weaker laboratories or for mergers which would increase the strength of the resulting laboratories.

A related question has to do with how much and what kinds of overlap there should be in the programs of the several laboratories. For example, how many laboratories should be devoting major efforts to finding ways to provide success in learning for children and youth from urban slums? Are we more likely to attain the desired results by having one, two, or many laboratories addressing themselves to this problem? Examination of this issue probably will not support the thesis that it should be the concern of each of the present regional laboratories simply because different forms of deprivation appear in the several regions. Is it desirable that laboratories within easy commuting distance of each other pool the talent and other resources necessary for real progress in identifying and coping with the conditions which make motivation so weak and progress in education so uncertain for so many of those growing up in our large cities? Again we may ask, how many laboratories need to concentrate their efforts on the education of the rural poor and the elevation of the quality of life in rural communities? How many need to address their efforts to the education of those whose native language is other than English?

Another question, which in a sense encompasses those already stated, is how much national planning is desirable for the laboratories? Is some degree of planning essential to avoid wasteful duplication and failure to deal with crucial problems or to follow some of the more promising approaches? Or, can the laboratories be expected to accomplish the same purpose through establishing networks for communication and coordination? If there is to be some degree of national planning for the laboratories, to what purposes should it be directed and through what mechanisms should it be exercised?

A question may also be raised as to the extent to which the several laboratories should engage in the evaluation of their own activities and of other programs such as those under Title I and III of the Elementary and Secondary Education Act.

It seems to me that we have an urgent need for the development of new technologies of evaluation, including diagnostic and analytical instruments of many kinds. In addition to using the instruments and knowledge developed in the field of measurement, it is necessary to bring to bear on the evaluation of education the sharpest tools that can be devised by economists and other social scientists. Otherwise we shall continue to intervene in education without any clear indications of the consequences of such intervention on the quality of the teaching-learning processes. If all of the laboratories engage in evaluative activities using the instruments at hand or those which can be readily improvised, I foresee little advance in the art and science of educational evaluation. Perhaps, there should be at least one laboratory which directs major efforts toward working with a Research and Development Center and other University scholars to develop a science and technology of evaluation and to train evaluators who may in time become available to the laboratories and to other educational institutions.

Some of the other questions to which attention is needed are:

1. Under what conditions is support of research in universities and other institutions justifiable?

2. Under what conditions, if any, are branch offices supportable?

3. How many distinctive types or models of laboratories are desirable?

4. What are the uses and abuses of PERT and of similar approaches to engineering education?

5. How many laboratories should engage in the construction or revision of curricula in such fields as English, social studies, mathematics and science?

6. Is it desirable that at least one laboratory attempt the working out of processes through which individuals may be able to make discriminating choices among values?

7. How much and what kinds of attention should be given to the contributions of the arts and humanities to education?

Not all of these questions can be subjected to discussion today and not all of them will be high on the agenda of the National Committee; but most of them sooner or later need to be taken into account; and I am sure you can offer other questions equally worthy of consideration.

PROGRAM PLANNING IN THE REGIONAL EDUCATIONAL LABORATORIES

(Extracted from report of study by Kjell Eide conducted between May 9 and July 9, 1967, under direction of Francis S. Chase and performed pursuant to a contract of The University of Chicago with the United States Department of Health, Education, and Welfare, Office of Education.)

The question as to whether the educational laboratories can form the institutional base for a new developmental function within education, must in my view be given an affirmative answer. In their short period of existence, the majority of the laboratories have been able to develop their own institutional profiles, distinctly different in terms of functions, organization, and attitudes from those of other educational or scientific institutions. This is so much more impressive since there has been no relevant pattern of institution building to copy, a condition that is reflected in the present wide range of variations displayed by the laboratories.

Nearly all the laboratories still have a long way to go before the present promises are fulfilled. The very limited resources currently at their disposal do not permit effective, full-scale operations of institutions of this kind. Furthermore, most of the laboratories are still in the process of developing their particular institutional functions, and of hiring and training the kind of professional staff required. However, provided a continued and balanced growth in resources and performance, the rather decisive, institution building phase of the regional educational laboratory program appears to have a fair chance of success.

Resource Identification

Most laboratories engaged in some sort of survey of regional resources during the development period, even if in some cases all it amounted to was a listing of potentially relevant institutions. At that stage, quite a few laboratories had ideas about establishing a resource bank system. Possibilities for overlapping with the ERIC system, and difficulties foreseen in the continuous updating and quality evaluation of resource information may be reasons for the laboratories--with a couple of exceptions--to drop these ideas.

There is very little evidence that the early surveying of regional research resources and ongoing research has contributed significantly to the actual content of lab programs. On the other hand, there can be no doubt about the program impact of the direct relationships between a large number of laboratories and universities and other regional research institutions, particularly in the form of submission of research proposals for funding. Initially resource based program items of this type are still frequent, in the form of projects to be either gradually phased out or fully integrated in the main in-house lab program.

The by far most important program impact of the regional resource base is due to the scarcity of resources prevailing in certain regions, and to its consequences for the staffing of the laboratories concerned. The failure of some laboratories to mobilize the needed high quality staff appears to constitute a rather decisive constraint to program content and/or program implementation. Regions with scarce resources tend to have special difficulties with "import" of qualified personnel from other regions, while at the same time new competitors in the local market are particularly unwelcome. The relative absence of such difficulties in most regions with abundant resources seems to accentuate a difference in working conditions for the various laboratories which may need particular attention.

Presently very few laboratories put major efforts into resource assessments. Increased competence of lab staff in more selected program areas may have contributed to this development. A high degree of reliance upon the capability of the ERIC system to provide most of the needed outside resource base is also to be found in many laboratories, particularly--as it seems--where research qualifications of lab staff are relatively weak. There is also an increasing tendency to look for resources outside the region, a development reflecting at least partly the loosening up of ties between a number of the laboratories and their region.

Needs Identification

Together with the early resource surveys, some needs assessment activities were carried out by almost all laboratories during the development period. Exceptions were one or two laboratories that refused to do so on the grounds that no meaningful needs assessment could be undertaken in such a short period. A few other laboratories could base their assessment upon major previous studies within the region. The rest did as best they could, some of them describing this early needs assessment as a ritual one had to get through.

The materials resulting from these assessments, as far as I have had a chance to see them, are very unsatisfactory, and they can hardly have been of much help for the early program development. Only a couple of labs today maintain that their present program bears any significant relationship to this early assessment work. However, as a part of this activity, quite a few laboratories engaged in often rather extensive surveys on opinions on needs in selected groups. There is very little evidence that even these activities had any major impact on programs, but they certainly served a purpose in the early attempts by the labs to advertise themselves.

Program Planning System

Three typical approaches to program planning can be identified within the educational laboratories. The first may be described as semi-intuitive, based on whatever evidence is available, and leaving wide margins for implicit value judgments. At least half of the laboratories will have to be put in this category. The second is characterized by a careful working out of the production process for one or a few chosen products, the production line being crowded with controls and evaluation processes, but the selection of products being still intuitive and open for implicit value judgments. The third approach, actually not fully applied by any laboratory, is based on an analysis of the total educational process as a system, identifying current strategic variables, and estimating total repercussions all through the system of potential changes in individual variables.

A mixture of the intuitive and the product-oriented approach is found in quite a few laboratories, in which the initial intuitive program selection is supposed to be gradually substituted by program planning based on feedback from elaborate evaluation systems. Such labs may eventually find themselves in the second category indicated above. In the case of two or three labs, evaluation plans are presently so ambitious that if they are implemented they might eventually lead to the development of a more comprehensive systems model for a major part of the educational fabric, thus potentially moving those labs toward the third program planning approach. However, this is still a rather uncertain vision, and the labs concerned do not yet appear to realize the potential of such a development.

It is interesting to note that although a typically product-oriented lab may be extremely concerned with evaluation and feedback directly related to its own production processes, it may give very little thought to the more general evaluation of the usefulness of this product to the educational system as a whole. At present, there thus appears to exist a certain alternativity between the product line approach and the systems approach to program planning. This lack of complementarity between the two approaches appears to be less the consequence of a logical contradiction than the result of a difference in historical background. The product-line approach has its precedence in industry, where a normally functioning market is supposed to provide all the feedback necessary for the evaluation of the product. The systems approach may owe more to traditions developed within public services, where market conditions quite frequently do not provide the kind of information needed for product evaluation, and where there exist a traditional feeling of responsibility for inherent product value that goes beyond possible successes in selling.

Eventually, there might be some hope for a merger of the product line and the systems approach. This would mean that the present tendencies towards more general systems thinking--beyond the mere product development--should be encouraged, while the extremely interesting product line processes worked out by those labs should be adopted by others.

It should also be mentioned that more intuitive program planning is often found in laboratories with a close relationship to their region and strong commitment to the solution of some of its problems. Some times these problems are so obvious to the lab that a more formalized program planning process may seem rather artifical, the real problem being in fact to find tactically appropriate ways of presenting the chosen program objectives.

There is certainly no reason to impose upon such laboratories an obligation to work towards what might appear to be more sophisticated approaches to program planning, nor to regard the programs emerging from more intuitive, tactically biased planning processes as less worthy of support. However, it might be worthwhile considering for some of the laboratories, whether more formalized planning procedures might in some cases contribute to the defense of essential program items against pressures from representatives of special vested interests.

Time and Development Dimensions

There appears to be a clear trend in the lab programs towards more emphasis upon long-term programs. This is a natural development, especially when the slackening of the initial pressure towards visibility is borne in mind. The abandoning of extensive service activities by a large number of labs adds to this effect.

In terms of the continuum from research through development to dissemination--a concept that is not accepted as useful for operational purposes by some of the more advanced laboratories--most lab programs are moving towards a more narrow range of activities. This may partly be due to USOE signals, and partly a matter of less resources than initially foreseen. In the majority of laboratories, both planned research and service activities have been reduced, in some cases to a drastic extent.

Development, field testing, and possibly demonstration seem to be the most favored lab activities more recently. This may be viewed as a natural consequence of the reduced university influence on lab policies, and the gradual development of in-house competence within the labs.

There may be some dangers in the present narrowing down of the scope of lab activities. Increasingly, the labs tend to define their "products" as something that emerges from their own in-house production processes, irrespective of the possible further fate of those products. The idea that the choice of product mix might be made on the basis of careful considerations about the likelihood of other agencies making use of the products in a way that would really make a difference to children, does not seem to be any closer to labs program planning today than a year ago. On the surface, it may seem that the recent emphasis upon development of clearly measurable products has lead some of the labs further away from this more general strategic thinking. It should not be excluded, however, that this apparent effect may have been caused by the practical difficulties facing the labs when beautifully designed programs are being put into operation.

The recent development towards more concentrated programs has led to unquestionable gains in terms of stronger lab institutions, more capable of controlling their own programs. Current programs are also by and large more compatible with available resources, although most labs still have programs presupposing a higher funding level in the future. Some real losses, however, should be recognized as a result of the narrowing down of program scope, in terms of reduced local involvement and interest in lab activities in quite a few cases.

Strong commitment by the laboratory staff to the substance of lab program, sometimes amounting to a genuine feeling of mission, is not infrequent in the regional educational laboratories. It tends in some cases to make the program planning of such a lab a rather artificial process, the real purpose of which is to convince all concerned about the need for what the staff members in question are set upon doing. There are clear dangers involved in this situation, especially if it leads to a rigid association of the laboratory to specific program items beyond the real usefulness of work in these particular areas. Still, being convinced that the operations of the educational laboratories has to imply a significant amount of value judgment, my hunch is that an explicit devotion to specific lab purposes is in the long run more fruitful than viewing the laboratory as an instrument for change "per se".

The current tendency for the laboratories to crowd certain "popular" subjects, and to leave alone others, possibly at least as important to the objectives of American education, certainly calls for a general long term policy at the central level, and for the necessary instruments for its implementation. The plea made here is only for a true concern for the final impact of the lab program judged by its own specific criteria developed for other purposes. As one of the conditions for criteria appropriate to the lab program, I would include an amount of flexibility reflecting the fact that the laboratories are in fact facing a wide variety of situations, calling for quite different institutional roles to be played. Too strong a push towards a homogeneous role may have rather detrimental effects to the proper functioning of the program as a whole, destroying one of its most potent characteristics.

A substantial part of the difficulties faced by the laboratories today is due to their operating far below their optimal scale. In my judgment, most of the laboratories have by now reached a state which permits a rapid expansion of their resources. If a continuous and fairly rapid growth in the resources available to the laboratories should not be forthcoming in the next couple of years, much of the present promise of the lab program will not be fulfilled. The task I have assumed to be the basic objective of the lab program, is not by far an easy one, and cannot be achieved at the present level of effort.

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